The integration of reverse pedagogy in pedagogical scenarios: case of science teachers

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ABSTRACT

Recent educational policies have the strong ambition to allow students to be at the center of interest and be an actor in their education and learning. The results of our survey carried out among 132 teachers of natural sciences and physical sciences (belonging to two cycles of education) underline the importance of designing educational situations in connection with personal information practices and the level of social culture and technological development of students.

In this article, we will examine the impact of the reverse pedagogy paradigm on two aforementioned levers, namely the improvement of the quality of teaching and the transformation of the role of the school and the teacher in the education system. Moroccan. And this in the horizon to present a reflection on pedagogical and didactic practices valuing the student in a real social situation.

Keyword : *Integration , Teaching, Reverse pedagogy, Active methods, Academic success ….*

1. INTRODUCTION

Over the past decades, the world of education has experienced various ideological, pedagogical, structural and technological transformations. The education system in turn took advantage of this development in order to redefine evaluation procedures and pedagogical models.

Throughout history, the official texts put in place in Morocco have all defended the improvement of the quality of education, the transformation of the role of the school and the teacher, governance and the management of change and the promotion of the individual and of society.

The strategic vision or the text of the 2015-2030 reform, made it possible to diagnose the reality of the Moroccan education system in order to rectify the structural and organizational dysfunctions towards schools active around the motto of `` equal opportunities for all '' '.

In this regard, What didactico-pedagogical adaptations would be conducive to the development of the teacher-learner relationship? What educational paradigm should be used in order to achieve the objectives outlined in the 2015-2030 strategic vision?

The objective of this article is to verify the contribution of the paradigm based on reverse pedagogy in science education, in order to trace the changes that have affected the development of students not only within the establishment but also in social life. These advances allow us to reposition the educational methods used by practitioners to enhance and implement them in today's education system.

2. LITERATURE REVIEW

Inverted methods come together in that they consist of putting the learner into activity. To do so, they take into account a very important dimension: action. The pupil is in action, he is in an active posture. He becomes an actor of his learning

In this sense, the reversed methods are placed in opposition with the so-called classical or traditional pedagogy, in which the learning situation is masterful and where the teacher is considered as the sole holder of knowledge.

Reverse pedagogy according to Marcel Lebrun and Julie Lecoq [1]. , is a method or an educational strategy based on the transfer of classic tasks where the transmissive part of the teaching (presentation, instructions, protocol.) is done remotely prior to a session in presence, in particular using technologies (online video of the course, reading of paper documents, exercise preparation, or any other similar tool.) [2]. and where learning based on activities and interactions takes place in person (exchange between teacher and learners and between peers, group project, laboratory activities, seminar, debate, etc.) [3].

More conceptually, we can represent the inverted classroom as a device of a hybrid nature with four main activities [4]. :

-    The Themes of which it is necessary to bring back elements of the visited contexts, to structure them somewhat, to prepare a small presentation in an original way by searching for information [7].

-    The so-called Type 2 activity in attendance: present, in class, the information and resources found, identify the differences and identify the similarities with the proposals of other students or other groups, experience a sociocognitive "conflict", explain preconceptions.

-    Type 1 activity at a distance: outside the classroom according to the initial diagram of the inverted classes, learn about the theories, identify the relevant elements for the theme investigated, prepare a summary, exercise the operation of the model.

-    Type 1 activity in attendance: in class again, consolidate what has been learned, make the model or theory work with regard to the themes investigated, prepare the transfer by approaching other situations.

Reverse pedagogy is then inspired by real contexts which are meaningful for the student, which can increase his level of motivation for the tasks which are proposed to him [8]. . It promotes lasting learning rather than requiring short-term memory.

We thus present some examples of teaching strategies that place the student in an active learner role: problem solving in all disciplines, teaching by project and case studies, synchronous cooperation and collaboration, discussions and debates, games of roles and simulation, gamification, concept map, peer teaching, creativity techniques (or idea generation techniques, brainstorming), portfolios, blogs and podcasts [5]. .

Several authors confirm that reverse pedagogy is one of the methods that come under what is called experiential learning [6]. , that is to say "learning by doing", it is about involving the learner in fictitious and real situations in addition to other simulation situations by means of technologization, so that he can use his faculties and develop their learning and skills of creativity, collaboration and concrete problem solving. Likewise for the teacher, pedagogy offers the opportunity to complete the work of the class; to prepare well for learning and to lead practical work in line with the requirements of the educational system benchmarks on the one hand and real social life on the other hand .

3. METHODOLOGY

Our methodology is based on a three-dimensional survey in which we first tested the degree of use of active pedagogy by teachers, then we assessed the impact of these pedagogical methods on student training, and finally we collected feedback from all the tutors and parents of the students questions from the second survey.

Our research context is represented by three schools, 2 of secondary education and 1 of college education (from the delegation of Taza, with a varied population of 431 students of all levels and fields, as well as a number of 132 teachers of natural and physical sciences, without forgetting the important role played by the heads of these establishments and the head of the guidance and supervision division at the provincial delegation of Taza.

The questionnaire is created from the models offered by the Google Forms tool , and distributed online by email and WhatsApp for teachers (by directors) between October 15 and November 11, 2021, and for students (by their teachers) between 12 and 22 November 2021.

We note that on the average collection of responses is recorded between 61% for teachers (81 of 132 targeted teachers) and 72% for students (310 of 431 chosen students) and this is the same case for parents whose percentages sent 58% (249 of 431 tutors of students).

And likewise the percentage of response recorded in the private sector was 82% against the public sector of 39%.

4. RESULTS

4.1 Reverse pedagogy and teachers

The questionnaire intended for teachers is made up of six sub-parts, five of which aimed at analyzing teachers' practices in reverse pedagogy.

The results of this survey are as follows:

The questionnaire appealed to teachers who teach two different teaching cycles for classes of four school levels according to **Table 1**

Table 1: Level of the pupils represented in the questionnaire

College		Qualifying	
49%		51%	
210 students		221 students	
2AC	3AC	1BAC	2BAC
17%	32%	22%	29%

Our sample is made up of 160 high school students with a percentage of 37% of 176 college students which represents 41% of our population and with a representativeness of 22% of which third college is represented by 32% of the total population .

Our second question of the questionnaire focused on the use of reverse pedagogies by teachers, the responses of which are illustrated in Table 2:

Table 2 : Use of reverse pedagogy

Use of reverse pedagogy	
Yes	No
61%	39%
81	51

The questionnaire shows that 61% of the population affirms the use of reverse pedagogy techniques, ie 81 teachers out of 132. Unlike 39% who still privilege traditional teaching

So to detail the activities that represent reverse pedagogy, we asked the teachers to describe the practices done in this direction (Table 3) :

Table 3: Active pedagogy methods used

Reverse pedagogy methods used				
Digital project	Learning collaborative	investigation	Serious games	Experiential learning
61%	53%	52%	11%	36%

Now let's look at the types of methods used. The answer to this question was multiple choice and offered 5 techniques used to implement reverse pedagogy.

In the 61% of teachers who use reverse pedagogy our questionnaire detected that :

- 61% of teachers use digital projects, 53% use collaborative work and peer learning, 52% of teachers use investigative or problem-solving techniques, 11% of teachers use serious games and the fun aspect of learning, and finally only 36% use an experiential learning mode.

Along with our study of the methods used in reverse pedagogy, we also studied the frequency of the call to this pedagogical model during the different phases of the sessions and the projects **Table 4 :**

Table 4: Frequency of implementation of reverse pedagogy

	For all the Classes	**Regularly**	**Sometimes**	**Rarely**	**Never**
Frequency of implementation of reverse pedagogy	**16%**	**11%**	**32%**	**23%**	**39%**

The extraction of the data from the questionnaire in a table 4 makes it possible to highlight that : No teacher uses the reversed methods all the lessons, for also 11% of the teachers use the reversed methods regularly against 39% of this category which does not offer no importance to these pedagogical strategies

Thus to measure the effect of the use of reverse pedagogy on the development of the learner, our survey aimed at monitoring the practices of the latter on the strategic, methodological, social and motivational level. **table 5 :**

Table 5: Impact of reverse pedagogy on the training of learners

	The reverse pedagogy success factor					
	Student involvement, active students	Acting and autonomous student	Responsible creative student	Significant progress	favorable climate and atmosphere in the classroom	No contribution
Teachers Using Reverse Pedagogy (81)	**81%**	**63%**	**68%**	**100%**	**100%**	**0%**
Classical education (51)	**21%**	**36%**	**19%**	**54%**	**55%**	**30%**

The analysis of the results mentioned in Table 5 shows that the contribution of recourse to reverse pedagogies is very significant, both strategically and on the motivational and social level, thus infecting the atmosphere within the classroom.

Finally, we questioned the teachers about the difficulties encountered in setting up a reverse pedagogy, the answers to which were as follows (**Table 6**):

Table 6: Difficulties encountered in setting up reverse pedagogy

Difficulties encountered in the implementation of a reverse pedagogy					
Too long preliminary preparation time	Limited time in class	Group management too difficult	Lack of experience in relation to reverse pedagogy	Low student engagement	Technological resource issues
62%	52%	41%	38%	12%	29%

The difficulties mainly raised by teachers are difficulties that we will qualify as organizational:
- "Too much prior preparation time" comes first with a mention in 62% of cases;
- the second is "Lack of time with the students" at 52%;
- the difficulty linked to class management comes in third place with its mention in 41% of the responses;
- with finally 29% who declared the presence of problems related to technological resources to set up educational mode.

4.2 Reverse pedagogy and students :

Our second part of the questionnaire is reserved for student feedback, the latter were identified thanks to our questionnaires intended for students whose results are mentioned in Table 6:

Table 6: Role of reverse pedagogy for students

Role of reverse pedagogy					
More motivated	Have a sense of learning	Responsible creative student	Significant progress	favorable climate and atmosphere in the classroom	No contribution
100%	**81%**	**78%**	**100%**	**100%**	**0%**

The values declared by the students clearly reflect that the reverse pedagogy positively influenced the students who found meaning in their learning (100%) and who became able to measure their progress (100%) and actively participate in the improvement of their learning. general teaching climate (100%).

III-   **Reverse pedagogy and parents of students**

Table 7: Feedback from the tutors and parents of the students - within the institution :

The reverse pedagogy is academic success factor	
Yes	**No**
83%	**17%**

The results of Table 7 indicate that : 83% of parents (guardians) surveyed believe that reverse methods are a factor in academic success for students within the establishment; And **17%** of them indicate the opposite.

Table 8: Feedback from the tutors and parents of the students - out of school :

Academic success outside of school	
Yes	**No**
92%	8%

Likewise for the results of table 8 , 92% of parents (guardians) surveyed believe that reverse methods are a factor in academic success for students outside of school compared to only 8% who state that these methods have no effect on their students.

Table 9: Aspects of academic success for tutors and parents of students

Aspects of social success					
Resourceful spirit, student strategist	**Initiate**	**Autonomy and decision-maker**	**Easily join a group**	**Have an open and dynamic vision**	**No contribution**
76%	65%	81%	73%	71%	0%

Finally, the results of our last question clarified that reverse pedagogy has made it possible to transform several behavioral aspects of their students, namely :
- 76 %% have acquired the qualities of unscramblers
- 81% have become decision-makers and autonomous
- 71% have become visionaries and strategists

As well as 73% demanded that their children Adhere easily to new groups and new social organizations

5. DISCUSSION

Currently, there is a great interest in reverse pedagogy, this pedagogy is associated with the currents of socioconstructivist thoughts. For an interest which manifests itself at all school levels, and according to a general rule fueled by a desire to make know-how more operational and to make learning acts more motivating and more authentic possible "real".

In our analysis part we have shown how reverse pedagogy has influenced teaching practices, despite all the difficulties declared by those who have resorted to this strategic model, it requires a significant investment in time and effort; the results illustrated reflected an indisputable satisfaction of the teaching staff with regard to the progress of the assigned students.

This reality is well founded by the possibilities of self-construction of the learning offered to the students and the change of the learning paradigm towards a vision centered on a student actor in the didactico-pedagogical process while integrating the gains of new technologies.

In another volte, the use of reverse pedagogy offered the students a development of their autonomy and their sense of responsibility, in parallel with an increase in their motivations and an unavoidable social integration.

Finally we positively consider the implementation of this educational model in the new paradigms of education to ensure an improvement in the quality of teaching and the changing role of the school and the teacher in the Moroccan educational system of 'on the one hand, and to transform pedagogical and didactic practices that enhance the student's value in a real social situation on the other hand.

6. CONCLUSION

Reverse pedagogy undoubtedly offers students the possibility of making choices and breaking away from the routine while promoting their motivation to learn, in other words the use of diversified pedagogical techniques can respond to the diversification of learning styles and by the same perspective offers motivating content for students and has a positive effect on their academic success and perseverance.

We have shown through our research that the use of reverse pedagogy has made it possible to break with traditional practices and provide content likely to develop technological and cultural skills in parallel with other socio-professional and communication skills.

We therefore believe that the implementation of this pedagogical model in teaching practices will have several advantages on students' academic performance. However, it is important to remember a set of precautions taken to set up this pedagogical model such as, respect for the principle of harmony, the balance between the different strategic models of this pedagogy and especially the choice of moments use of these methods in relation to academic progress and the spatiotemporal organization of learning projects.

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